

Command 21: Decision Support for Operational Command Centers

“Enabling Knowledge-Centric Warfare for Fleet Decisionmakers”



The CNO’s Strategic Studies Group XVI report “Command 21 - Speed of Command” recognized that:

- Fleet decision makers are faced with too much *data* - not enough *information*.
- Fleet information systems are often not designed to support the decision makers.
- Reduced manning requirements, complex mission requirements, etc. will further exacerbate the problem. One of the key recommendations to come out of the Command 21 report was that decision support technology developed by SSC under the Tactical Decision-Making Under Stress (TADMUS) project should be extended from single ship combatants to higher echelons of command. **The Command 21: Decision Support for Operational Command Centers (Command 21)** program is addressing this recommendation by conducting research into the unique requirements of decision-making within military operational command centers. Command 21 is utilizing cognitive task analysis and Naturalistic Decision-Making theory as part of the system engineering process to ensure that military information systems are based upon the needs and capabilities of the decision-makers who use them. Cognitive task analyses provide the basis for determining what data in fact constitutes information, what constitutes expertise, and what the barriers to effective decision making

are, as well as what strategies expert decision-makers use in solving problems. The results are critical for designing information systems that support the way expert decision-makers actually make decisions.

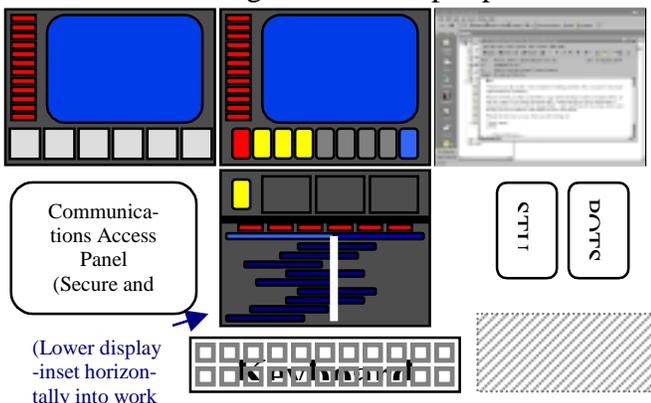
Command 21 performance improvements will result from careful analysis of decision requirements to determine the kinds of support needed by tactical decision-makers. Efficiency is achieved by reducing the need of decision-makers to cull through data to extract information, generate knowledge, and achieve understanding. Adding situational context and minimizing cognitive workload further supports the decision-making process. The quality of command decisions are enhanced while reducing the need for support personnel, thus facilitating reduced manning.

Command 21 has determined that military decision makers engage in “asynchronous collaboration”, where the decision-makers are working on different parts of a common problem; each at having their own decision cycle. This is different from traditional “synchronous” collaboration, such as “brain storming”. Staff-wide synchronization is achieved when staff briefings are given to the entire staff periodically. As a result, the Command 21 project has determined that unique collaboration tools are required to support mili-

tary command centers. “Speed of Command” can be increased when all decision-makers have ready access to the best data available at all times, presented as meaningful information organized around critical decisions.

The knowledge wall shown above is part of a revised concept of operations being developed to support the unique collaboration requirements seen in military command centers. It is specifically being designed for the CJTF staff in a Joint Operations Center. It represents an integrated “picture window into a sea of information” rather than the “portholes into an ocean of data” found in current CJTF systems with their independent systems and non-integrated / synchronized information displays. The wall features a series of windows incorporating decision support tools tailored to the CJTF, as well as windows with “summary status” information being “pushed” from the anchor desks used by liaison officers (LNOs) representing the various CJTF Departments, (e.g. METOC, Air, Intel, C4I, PAO, etc.). The battle watch captain can choose aspects of the situation on which to focus, and the appropriate anchor desk displays for the collaborative workspace in the center of the data wall, where a more detailed view of the underlying data would be displayed. Other tools are being developed to support the “pushing” of information between the LNO anchor desks.

The second figure shows how a watch-station being developed for DD-21, as part of the ONR Manning-Affordability ATD could be adapted to allow LNO collaboration by using COTS applications and information-push tools. The console consists of an integrated “desktop” spread across



four different display surfaces. Information such as graphics or text data from a variety of disparate sources could be “dropped and dragged”, as is common with modern COTS graphic user interfaces. Three display surfaces are arrayed across the front of the workstation, while the fourth is embedded within the physical desktop. The concept of operations for this console is that the same HCI metaphors could be used across a variety of COTS / MOTS applications for each decision-maker in the command center. Basic applications would be tied to specific areas of the workstation. For instance, the top right display has been dedicated to routine office tasks such as preparing briefs, processing e-mail, writing memos, etc. The central display in the upper array is dedicated to providing the tactical situation “big picture”, as in a GCCS-M derived geo-plot with tactical track data overlaid on it. In the desktop is a dedicated place for monitoring the execution of an operational plan, such as J-Flex. This is where the operator would look for information regarding the pace of operations, or failures in various aspects of the plan. The far-left display in the upper array is a tool explicitly designed to facilitate sharing information. The concept here is that decision support tools would facilitate the “pushing” of information from one operator to the rest of the command staff. It would consist of questionnaires, forms, prompts that would facilitate decision-makers in understanding what information they have that would be of interest to others on the command staff, and assist them in presenting it in a manner that others would recognize and understand.

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